EPSON

P-40

OPERATING MANUAL

P8390096-0
Y550991020

FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFERENCE STATEMENT

"This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to proved reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

..... reorient the receiving antenna
..... relocate the computer with respect to the receiver
..... move the computer away from the receiver
..... plug the computer into a different outlet so that computer and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions.
The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio-TV Interference Problems."
This booklet is available from the US Government Printing Office, Washington, D. C., 20402, Stock No. 004-000-00345-4."

This statement will be applied only for the printers marketed in the U.S.A.

The connection of a non-shielded printer interface cable to this printer will invalidate the FCC Certification of this device and may cause interference levels which exceed the limits established by the FCC for this equipment.

PREFACE

The EPSON P-40 is a compact, portable thermal printer which operates on NiCd (Nickel-Cadmium) batteries. This printer features various print modes, including two bit image modes and character sets for 9 countries.

It is recommended that you read this manual thoroughly before using the printer, to make the best use of its many functions.

Your comments concerning the contents of this manual, or any errors noted, are appreciated and help us improve our products.

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Chapter 1

PREPARATION

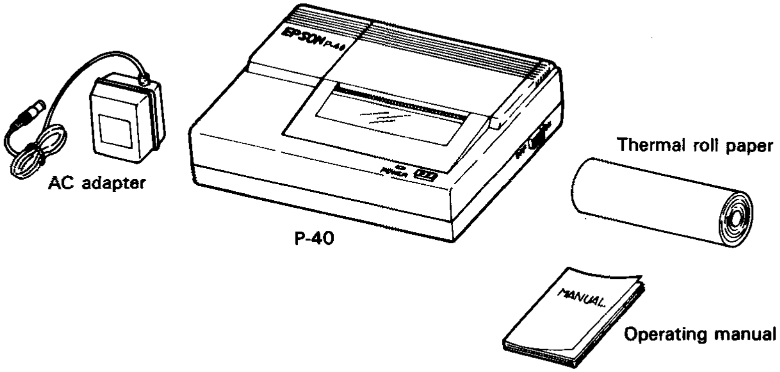
1.1 Notes on Use

Please observe the following precautions, to keep your P-40 in optimum condition.

* If any problems should occur during operation, turn the power off immeidately and contact your dealer.
* Avoid operating or storing the printer in damp places, or when exposed to excessively high or low temperatures.
* Avoid exposing the printer to direct sunlight.
* Do not operate the printer near heaters.
* Avoid operating or storing the printer in dusty places.
* Do not expose the printer to excessive vibration.
* Install the printer on a level surface.

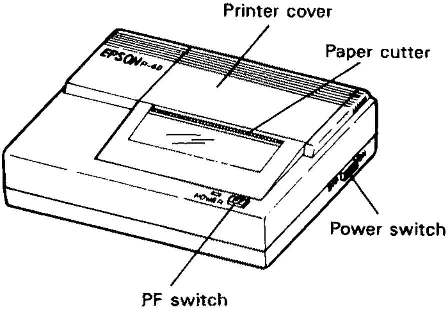
1.2 Unpacking

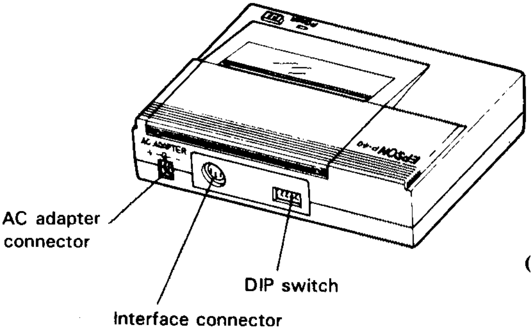
Check that the following items are included in the packing carton after unpacking.



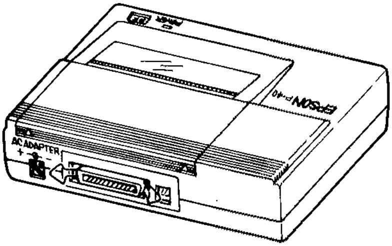
NOTE:
Keep the carton and packing materials. You may need them in the future, if the printer must be transported again.

1.3 Appearance





(Serial Type)



(Parallel Type)

Chapter 2

OPERATION

2.1 Power Supply

The P-40 power supply consists of a built-in NiCd battery pack. The NiCd battery pack should be handled correctly, as described below.
Although all NiCd battery packs are fully charged when they are shipped from the factory, your unit may have discharged.
Please recharge the pack with the appropriate AC adapter before using the printer.

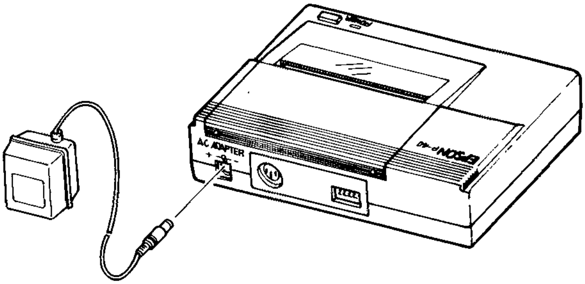
[AC adapter]

AC adapters differ from country to country as shown below.

Country/Area	Voltage	AC adapter
U.S.A.	120 V	H00AAA
France	220 V	H00AAF
Germany	220 V	H00AAG
U.K.	240 V	H00AAU
Oceania	240 V	H00AAU
South-east Asia	120 V 220 V	H00AAA H00AAU

[Charging procedures]

Turn off the printer's POWER switch. Plug the AC adapter into an AC outlet and connect the cable to the printer. The battery pack takes 6 to 7 hours to become fully recharged.



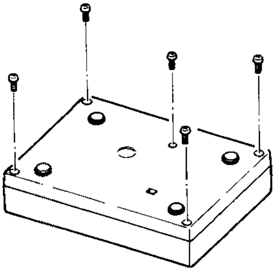
NOTES:

- *Make sure you turn off the POWER switch before charging the battery pack.*
- *Do not charge the pack longer than 24 hours, or the batteries may deteriorate.*
- *The room temperature should be between 5 to 40°C during charging.*
- *Do not leave the printer with the POWER switch on for long periods since this discharges the pack too much, resulting in deterioration of the batteries.*
- *The printer can be used immediately after the AC adapter is connected. However, if the battery pack is not fully charged, printing may stop if high duty printing is performed.*

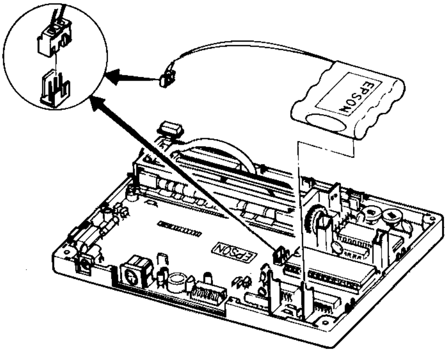
[Replacing the battery pack]

Renew the battery pack if it discharges within an extremely short time. Make sure you use the specified replacement battery pack (Epson Model C20RB).

1) Turn off the POWER switch.
2) Remove the five screws retaining the upper cover to the bottom cover and remove the upper cover.



3) Disconnect the battery connector and remove the battery pack. Install the new battery pack and attach the battery connector in the correct direction.



4) Replace the upper cover.

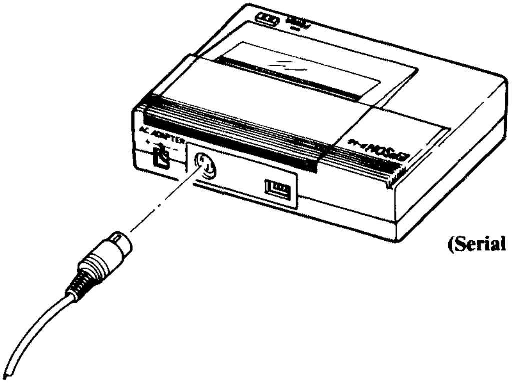
NOTES:

- *Make sure you turn off the POWER switch.*
- *Do not disassemble the battery pack.*
- *Hold the connector body not the lead, when disconnecting the battery connector.*
- *Do not short circuit the battery pack terminals.*
- *Do not incinerate used battery packs.*

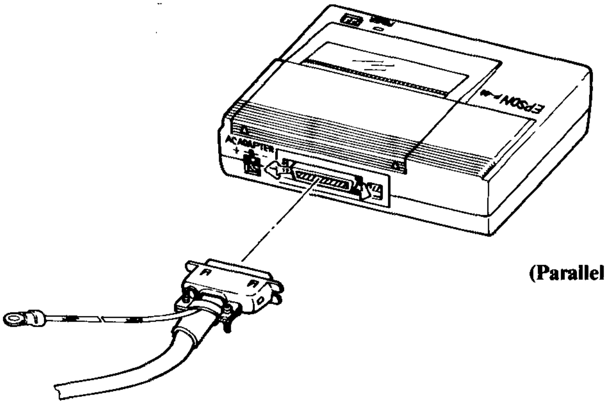
2.2 Interface Cable Connection

Observe the following precautions when connecting the printer to the host computer.

- The host computer power switch must be off.
- The P-40 power switch must be off.
- Use the correct interface cable. (Interface cables are available at your EPSON dealer.)
- Ensure all connectors are inserted correctly.



(Serial Type)



(Parallel Type)

2.3 Switches and Indicators

The POWER switch is located on the right side of the case. The paper feed (PF) switch and the POWER indicator are located on the right front corner of the top panel.

POWER switch: Locking slide switch

- This switch turns the power on and off.
- The printer initializes automatically when this switch is turned on. (All previous function settings set by control codes are reset.)

PF (paper feed) switch: Non-locking pushswitch

- Pressing this switch feeds paper on line.
- The paper is continuously fed if this key is held on.
- Line spacing is set by the ESC 2 or ESC A codes.
  The default line spacing is 1/6 inch.

POWER indicator: Red LED

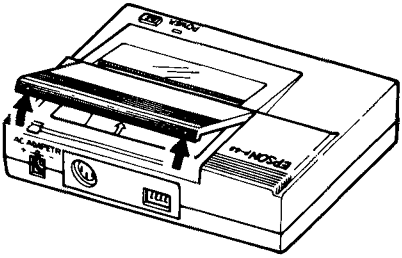
This LED lights when power is on.
(If it does not light when the POWER switch is turned on, the battery pack may be discharged.)

2.4 Paper Loading

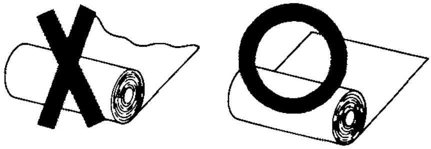
The P-40 uses Epson thermal roll paper (P40TRP). A red mark printed on the paper appears when only 30 cm of paper remains. Load a new roll when this mark is visible.

[Paper loading procedures]

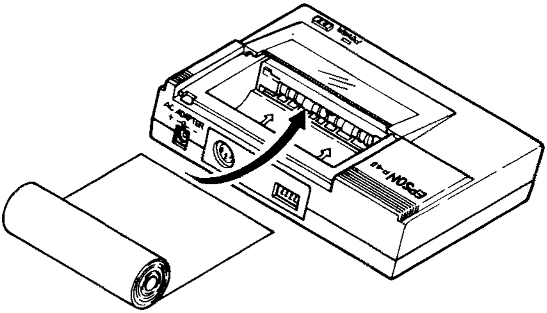
1) To remove the printer cover, lift the front of the cover while pressing the position marked " ▼ ".



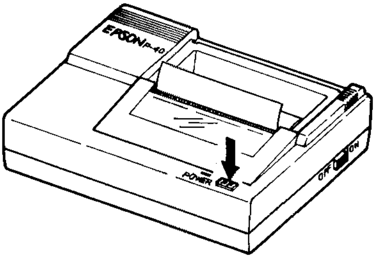
2) Turn on the printer POWER switch.
3) Cut the leading edge of the paper so that it is parallel to the roll shaft.



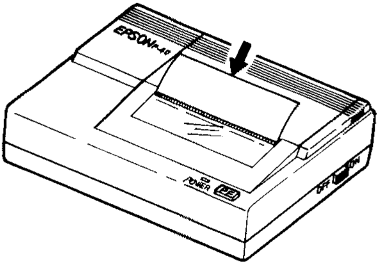
4) Align the paper so it is straight when you insert it into the paper inlet. Do not insert paper with the wrong surface facing up.



5) Press the PF switch to feed the paper until the leading edge of the paper passes the paper cutter.



6) Replace the printer cover so that paper exits through the slit.



[Notes on handling paper]

Make sure you use the specified paper (Epson thermal roll paper R40TRP). Observe the following precautions when storing paper rolls.

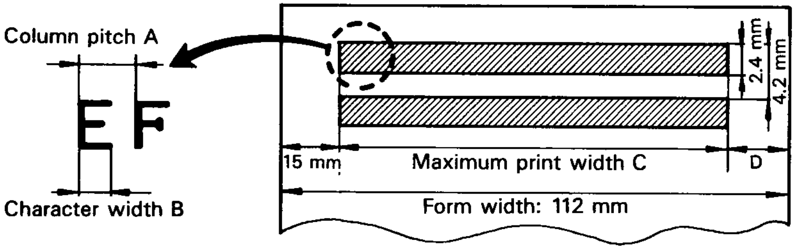
- Do not store paper rolls in places subject to high temperature or humidity.
- Do not store paper rolls in a places exposed to direct sunlight.

Observe the following precautions when handling printed paper.

- Do not use pastes containing organic solvents such as alcohol, esters or ketones.
- Do not allow the paper to come in contact with vinyl chloride.
- Do not use cellophane tape on the paper.
- Do not allow printed paper to come in contact with diazo copy paper which has just been processed.

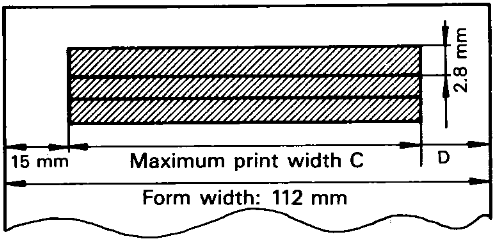
[Print position]

1) Text mode (character font: 5 × 7 dot matrix characters with single dot spacing between characters)



	A Column pitch (mm)	B Character width (mm)	C Maximum print width (mm)	D Right margin (mm)
20 col. mode	4.2	3.5	83.3	13.7
40 col. mode	2.1	1.7	83.7	13.4
80 col. mode	1.1	0.9	83.8	13.2
72 col. mode	1.2	0.9	87.9	9.2

2) Graphics mode



	C Maximum print width (mm)	D Right margin (mm)
256 dots/line bit image mode	89.6	7.4
480 dots/line bit image mode	84.6	13.0

NOTE:

The print starting position may shift by up to 1/2 dot-pitch.

2.5 Self-test Function

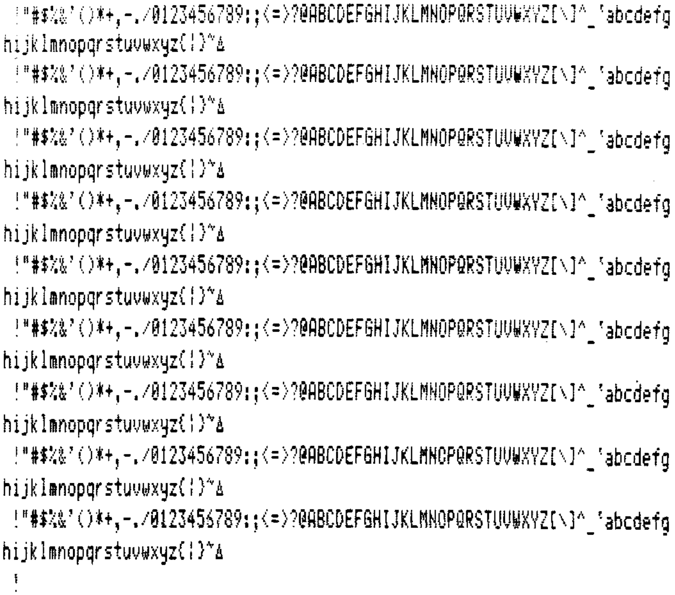
The P-40 is equipped with a self-test function which makes it possible for the user to check the following.

1) Control functions
2) Printer mechanism functions
3) Print quality

[Self-test procedures]

To start the self-test, turn on the power switch while pressing down the PF switch. During the test, ASCII characters are repeatedly printed in the condensed print mode with 2-dot character spacing, and a line spacing of 1/6 inch.

NOTE:
Do not perform the self-test without any paper in the printer. To stop the test, turn off the POWER switch.



```
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefg
hijklmnopqrstuvwxyz{|}~△
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefg
hijklmnopqrstuvwxyz{|}~△
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefg
hijklmnopqrstuvwxyz{|}~△
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefg
hijklmnopqrstuvwxyz{|}~△
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefg
hijklmnopqrstuvwxyz{|}~△
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefg
hijklmnopqrstuvwxyz{|}~△
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefg
hijklmnopqrstuvwxyz{|}~△
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefg
hijklmnopqrstuvwxyz{|}~△
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefg
hijklmnopqrstuvwxyz{|}~△
 !
```

2.6 DIP switch settings

The circuit board of the serial-type printer includes an 8-position DIP switch, and that of the parallel type includes a 2-position DIP switch. The DIP switch is easily accessed. Various functions can be selected by setting the DIP switches.

[Setting DIP switches]

1) Turn off the POWER switch.
2) Set the DIP switches for the desired functions as listed in the table below. Use a screwdriver, ball-point pen, or similar pointed object to set each individual switch.

[Serial Type]

Switch No.	Function	ON	OFF	Factory setting
1	$\overline{\text{AUTO FEED XT}}$ (Note 1)	Valid	Invalid	OFF
2	Parity	Valid	Invalid	OFF
3	Parity	Even	Odd	OFF
4	Word length	7 bits	8 bits	OFF
5	Bit rate 3	See the table below.		OFF
6	Bit rate 2			ON
7	Bit rate 1			OFF
8	Bit rate 0			ON

Bit rate (B.P.S)	SW5	SW6	SW7	SW8
75	ON	ON	ON	ON
110	ON	ON	ON	OFF
134.5	ON	ON	OFF	ON
150	ON	ON	OFF	OFF
200	ON	OFF	ON	ON
300	ON	OFF	ON	OFF
600	ON	OFF	OFF	ON
1200	ON	OFF	OFF	OFF
1800	OFF	ON	ON	ON
2400	OFF	ON	ON	OFF
4800	OFF	ON	OFF	ON
9600	OFF	ON	OFF	OFF

* Settings other than those listed can not be used.

[Parallel Type]

Switch No.	Function	ON	OFF	Factory setting
1	Character set (Note 2)	USA	JAPAN	ON
2	$\overline{\text{AUTO FEED XT}}$ (Note 1)	Valid	Invalid	OFF

NOTES:

1. *When this switch is ON, a line feed is made automatically whenever a carriage return is input.*
2. *Character set selected when power is turned on.*

Chapter 3

SOFTWARE CONTROL

3.1 Introduction

There are two types of the P-40 printer: the serial type, which is equipped with an RS-232C serial interface, and the parallel type, which is equipped with a Centronics parallel interface.

When connecting a serial type P-40, you must set the same RS-232C parameters for both the P-40 and the host computer. The RS-232C parameters for the P-40 can be set by DIP switch. (See Section 2.6.) Refer to the manual provided with the host computer concerning data transmission to the printer.

The parallel type can be used without following any special procedures. For example, to print the character string "ABC" from the Microsoft BASIC, execute

```
LPRINT "ABC";
```

The P-40 has many useful functions which can be used by sending control codes to the printer. These control codes are explained below.

3.2 Control Codes

3.2.1 Print Execution

CR

Name Carriage return

Format **CHR$(13);**

Function This code prints the contents of the print buffer.
When the DIP SW makes AUTO FEED XT valid, the paper is automatically advanced by one line after printing.
If the print buffer contains no data or only spaces, CR does not move the print head and merely advances the paper by one line when AUTO FEED XT is valid.
This code cancels the enlarged mode set by SO.

Example Double printing can be made by using CR.

```
10 'Carriage return
20 LPRINT "Underscore with CR";
30 LPRINT CHR$(13);
40 LPRINT "__________"
50 END
```

```
Underscore with CR
```

On ZX Spectrum : Turn AUTOFEED (SWITCH 2) off.

```
OPEN #3;"b"
10 LPRINT "underscore this way"
20 LPRINT CHR$13                % carr. ret.
30 LPRINT [illegible] "          ____"
40 LPRINT CHR$10
```

3.2.2 Print Format

(1) Line feed

LF

Name Line feed

Format **CHR$(10);**

Function This code prints all data in the print buffer and advances the paper by one line.
If the print buffer contains no data or only spaces, LF merely advances the paper one line.
LF cancels the Enlarged mode set by SO.
The amount of line spacing is determined by ESC 2 or ESC A. 1/6-inch line specing is automatically selected upon power on.

See also ESC 2 and ESC A

ESC 2

Name Set 1/6-inch line space

Format **CHR$(27);"2";**

Function This sequence sets the line spacing to 1/6 inches.
1/6 inch corresponds to 12 dots.
1/6 inch is the default line space setting.

Example

```
10 'ESC 2
20 LPRINT " * ESC 2 *
30 LPRINT CHR$(27);"2";
40 FOR I=1 TO 6
50 LPRINT "1/6 inch line spacing"
60 NEXT I
70 END
```

```
 * ESC 2 *
1/6 inch line spacing
1/6 inch line spacing
1/6 inch line spacing
1/6 inch line spacing
1/6 inch line spacing
1/6 inch line spacing
```

See also LF and ESC A

ESC A

Name Set n/72-inch line space

Format **CHR$(27);"A";CHR$(n);**
(n=8 or 12)

Function This sequence sets the amount of line space to n/72 inches.

n=8	1/9 inch line space (corresponds to 8 dots)
n=12	1/6 inch line space

Example

```
10 'ESC A
20 LPRINT "      < ESC A >";CHR$(10);
30 N=8:LPRINT "* N=8: 1/9 INCH LINE SPAC
E"
40 GOSUB 80
50 N=12:LPRINT "* N=12: 1/6 INCH LINE SP
ACE":LPRINT:
60 GOSUB 80
70 END
80 FOR I=1 TO 5
90 LPRINT CHR$(27);"A";CHR$(N);
100 LPRINT "ESC A+";N;" line spacing"
110 NEXT I
120 LPRINT CHR$(10);
130 RETURN
```

```
     < ESC A >
* N=8: 1/9 INCH LINE SPACE
ESC A+ 8  line spacing
ESC A+ 8  line spacing
ESC A+ 8  line spacing
ESC A+ 8  line spacing
ESC A+ 8  line spacing

* N=12: 1/6 INCH LINE SPACE

ESC A+ 12  line spacing

ESC A+ 12  line spacing

ESC A+ 12  line spacing

ESC A+ 12  line spacing

ESC A+ 12  line spacing
```

See also LF and ESC 2

3.2.3 Character design

(1) Enlarged

SO

Name Set Enlarged mode with auto-reset

Format **CHR$(14);**

Function This code causes subsequent characters on the same line to be printed in the Enlarged mode. The Enlarged mode set by this code is cancelled by a CR, LF, or DC4.

If the enlarged and emphasized modes are specified in the same line, only the emphasized mode becomes effective. If the emphasized mode is subsequently cancelled, the enlarged mode becomes effective.

If SI is received in the enlarged mode, it is accepted but the condensed mode is not set until the enlarged mode is cancelled. If SO is received in the condensed mode, it is ignored.

Example

```
10 'Enlarged mode with auto-reset
20 LPRINT "*SO*SO* Normal *SO*SO*";
30 LPRINT CHR$(10);
40 LPRINT CHR$(14);
50 LPRINT "*SO* Enlarged *SO*";
60 LPRINT CHR$(10);
70 LPRINT "*SO*SO* Normal *SO*SO*";
80 END
```

```
*SO*SO* Normal *SO*SO*
*SO* Enlarged *SO*
*SO*SO* Normal *SO*SO*
```

DC4

Name Cancel Enlarged mode with auto-reset

Format **CHR$(20);**

Function This code cancels the Enlarged mode set by SO. (SO is also canceled by a CR or LF.)

Example

```
10 'Cancel enlarged mode
20 LPRINT CHR$(14);"*SO*SO*";
30 LPRINT CHR$(20);"*DC4*DC4*DC4*"
40 END
```

```
*SO*SO**DC4*DC4*DC4*
```

(2) Condensed

SI

Name Set condensed mode

Format **CHR$(15);**

Function This code causes subsequent characters on the same line to be printed in the Condensed mode. The Condensed mode set by this code is cancelled by DC2.

When SO is input in the Condensed mode, it is ignored.

The column width can be altered to switch the number of characters per line from 80 to 72 (or vice versa) by ESC (space).

If the emphasized and condensed modes are both specified, only the emphasized mode becomes effective. If the emphasized mode is subsequently cancelled, the condensed mode becomes effective.

If SI is received in the enlarged mode, it is accepted but the condensed mode is not set until the enlarged mode is cancelled.

Example

```
10 'Condensed mode
20 LPRINT "*SI*SI*SI* Normal mode *SI*SI
*SI*"
30 LPRINT CHR$(15);
40 LPRINT "*SI*SI*SI* Condensed Mode *SI
*SI*SI*"
50 LPRINT "*SI*SI*SI*SI*SI*SI*SI*SI*SI*S
I*SI*SI*"
```

```
*SI*SI*SI* Normal mode *SI*SI*SI*
*SI*SI*SI* Condensed Mode *SI*SI*SI*
*SI*SI*SI*SI*SI*SI*SI*SI*SI*SI*SI*SI*
```

DC2

Name Cancel Condensed mode

Format **CHR$(18);**

Function This code cancels the Condensed mode set by SI.

Example

```
10 'Cancel condensed mode
20 LPRINT CHR$(15);"*SI*SI*SI*SI*SI*";
30 LPRINT CHR$(18);"*DC2*DC2*DC2*"
40 END
```

```
*SI*SI*SI*SI*SI**DC2*DC2*DC2*
```

ESC (space)

Name Set Condensed character space

Format **CHR$(27);" ";CHR$(n);**
(n=0 or 1)

Function This code sequence determines the number of dots to the right of each condensed character as follows.

n=0	1-dot space, 80 characters/line
n=1	2-dot space, 72 characters/line

One dot's space is automatically selected when the power is turned on. (Two dot's space is selected during self-test).

Example

```
10 'Character spacing
20 LPRINT CHR$(15);
30 LPRINT CHR$(27);" ";CHR$(1);
40 LPRINT "<72chr/line>":GOSUB 80
50 LPRINT CHR$(27);" ";CHR$(0);
60 LPRINT "<80chr/line>":GOSUB 80
70 END
80 FOR I=32 TO 127
90 LPRINT CHR$(I);
100 NEXT
110 LPRINT CHR$(10);
120 RETURN
```

```
<72chr/line>
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefg
hijklmnopqrstuvwxyz{¦}~▵
<80chr/line>
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmno
pqrstuvwxyz{¦}~▵
```

(3) Emphasized

ESC E

Name Set Emphasized mode

Format **CHR$(27);"E";**

Function This sequence causes the subsequent data to be printed in the Emphasized mode.

If the emphasized mode is specified together with the condensed or enlarged mode, only the emphasized mode becomes effective. If the emphasized mode is subsequently cancelled, the other mode becomes effective. (See samples on next page).

Example

```
10 'Emphaized mode
20 LPRINT "* Normal * Normal * Normal *"
30 LPRINT CHR$(27);"E";
40 LPRINT "* Emphasized * Emphasized * E
mphasized *"
50 END
```

```
* Normal * Normal * Normal *
* Emphasized * Emphasized * Emphasized *
```

ESC F

Name Cancel Emphasized mode

Format **CHR$(27);"F"**

Function This sequence cancels the Emphasized mode set by ESC E.

Example 1

```
10 'Emphaized and Enlarged
20 LPRINT CHR$(14);
30 LPRINT "* SO * ";
40 LPRINT CHR$(27);"E";
50 LPRINT "* SO+ESC E *";
60 LPRINT CHR$(27);"F";
70 LPRINT " * SO *"
```

```
*  SO  *  * SO+ESC E *  *  SO  *
```

Example 2

```
10 'Emphaized and Condensed
20 LPRINT CHR$(15);
30 LPRINT "* SI:Condensed * -";
40 LPRINT CHR$(27);"E";
50 LPRINT "* SI+ESC E:Emphasized *";
60 LPRINT CHR$(27);"F";
70 LPRINT " * SI:Condensed *"
```

```
* SI:Condensed * * SI+ESC E:Emphasized * * SI:Condensed *
```

(4) Character Set

ESC R

Name Select international character set

Format **CHR$(27);"R";CHR$(n);**
(0≤n≤8)

Function When this sequence is input, all subsequent data is printed using the character set of the country specified by n.

n represents one of the following country character sets.

When the power of the serial type is turned on, the default value of n is 0.
The default value of n for the parallel type can be set to either 0 or 8 by DIP SW1.

n	Country
0	U.S.A.
1	France
2	Germany
3	England
4	Denmark
5	Sweden

n	Country
6	Italy
7	Spain
8	Japan

Code tables and character fonts are shown in Appendices C and D.

Example

```
10 'International character sets
20 FOR I=0 TO 8
30 LPRINT CHR$(27);"R";CHR$(I);
40 READ A$
50 DATA "USA       ","France    ","Germany
  ","England   ","Denmark   ","Sweden    ",
"Italy     ","Spain     ","Japan     "
60 LPRINT "n=";I;A$;":   ";
70 LPRINT CHR$(35);CHR$(36);CHR$(64);
80 FOR K=91 TO 96
90 LPRINT CHR$(K);
```

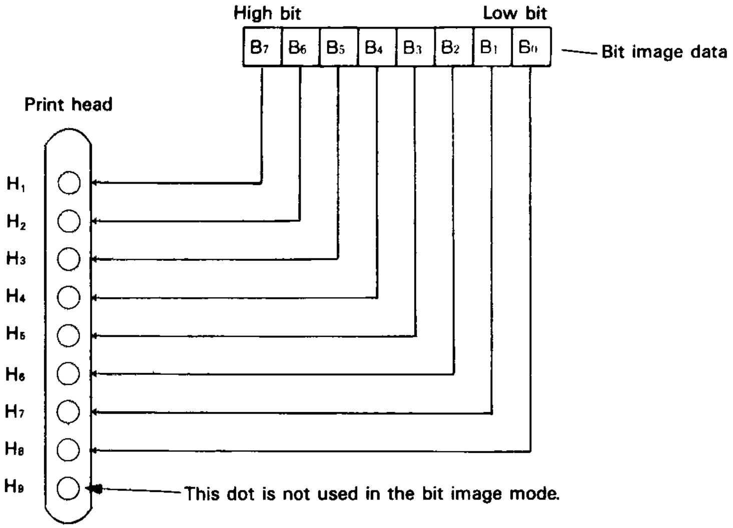
```
100 NEXT
110 FOR J=123 TO 126
120 LPRINT CHR$(J);
130 NEXT
140 LPRINT
150 NEXT
160 END
```

```
n= 0 USA        :    #$@[\]^_`{|}~
n= 1 France     :    #$à°ç§^_`éùè¨
n= 2 Germany    :    #$§AOU^_`äöüß
n= 3 England    :    £$@[\]^_`{|}~
n= 4 Denmark    :    #$@ÆØÅ^_`æøå~
n= 5 Sweden     :    #¤ÉAOÅU_éäöåü
n= 6 Italy      :    #$@°\é^_ùàòèì
n= 7 Spain      :    ₧$@¡Ñ¿^_`¨ñ}~
n= 8 Japan      :    #$@[¥]^_`{|}~
```

3.2.4 Bit Image Mode

Bit image

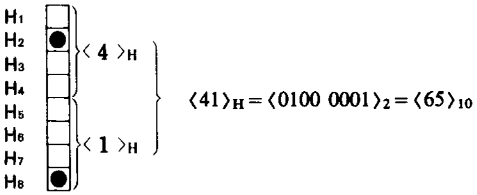
The bit image mode is a printing mode in which each dot of print head can be controlled indivisually. The relationship between bit image data and print head is shown below.



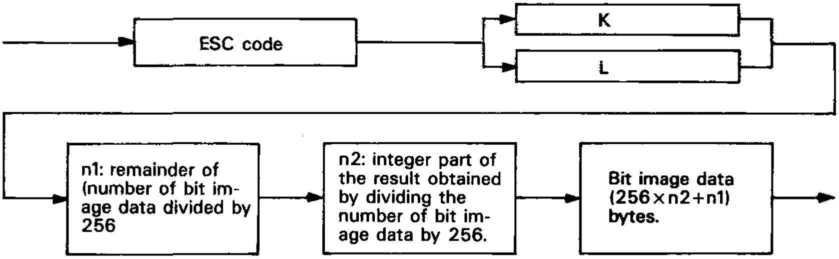
For example, when data is $<129>_{10}$ (= $<10000001>_2$, dots H1 and H8 are fired. (That is, heads corresponding to bits whose values are 1 are fired.)
In the text mode, executing

LPRINT CHR$ (65)

results in printing "A".
In the bit image mode, executing it resulting in printing the following pattern.

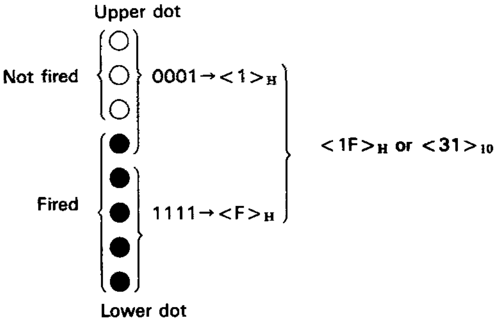


To transfer bit image data, use the following sequence.


ESC code
K
L
n1: remainder of (number of bit image data divided by 256
n2: integer part of the result obtained by dividing the number of bit image data by 256.
Bit image data (256×n2+n1) bytes.

Bit image data transfer sequence

Each bit image data byte is configured so that "1" bits correspond to the print head wires to be fired and "0" bits correspond to those not to be fired. For example, the following pattern can be printed by sending CHR$ (31) as bit image data from the computer.



ESC K

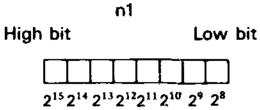
Name Set normal density bit image mode

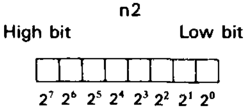
Format **CHR$(27);"K";CHR$(nl);CHR$(n2);**
(0≤nl≤255, n2=0 or 1)

Function This code sequence sets the normal density bit image mode. The specified number of bytes of data following this sequence is printed in the bit image mode.

The number of dots in the horizontal direction which are printed in the bit image mode is specified with nl and n2. When the number of dots in the horizontal direction is a, nl and n2 are as follows.

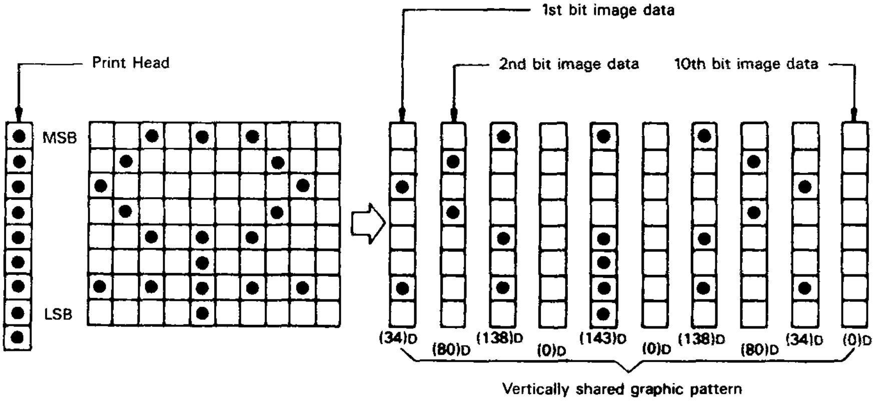
nl is the remainder of a divided by 256 (a MOD 256)
n2 is the integer part of the results obtained by dividing a by 256 (INT(a/256))





The maximum number of dots in the horizontal direction is 256 If the amount of data sent for bit image printing exceeds the maximum number of dots per line, excess data is discarded. The bit image mode is automatically cancelled after one line has been printed.
To print more than one line in the bit image mode, the mode must be set for each line.

Example



<Example of Graphic Pattern Formation>

```
10 'ESC K
20 FOR J=1 TO 5
30 LPRINT CHR$(27);"K";CHR$(10);CHR$(0);
40 FOR I=1 TO 10
50 READ R
60 LPRINT CHR$(R);
70 NEXT
80 LPRINT "   ";
90 DATA 34,80,138,0,143,0,138,80,34,0
100 RESTORE
110 NEXT
120 END
```

ESC L

Name Set dual density bit image mode

Format **CHR$(27);"L";CHR$(nl);CHR$(n2);**
(0≤nl≤255, n2=0 or 1)

Function This code sequence sets the dual density bit image mode. The specified number of bytes of data following this sequence is printed in the 480 dots/line bit image mode.

nl and n2 are determined in the same manner as for ESC K. The maximum number of dots in the horizontal direction is 480. If the amount of data sent for bit image printing exceeds the maximum number of dots per line, excess data is discarded.

The bit image mode is automatically cancelled after one line has been printed. To print more than one line in the bit image mode, the mode must be set for each line.

Example

```
10 'ESC L
20 LPRINT CHR$(27);"L";CHR$(255);CHR$(0)
;
30 FOR I=1 TO 255
40 LPRINT CHR$(I);
50 NEXT I
60 LPRINT
70 END
```

APPENDIX A. Specifications

I. Printer

1) Type : Thermal dot matrix printer
2) Printing direction : Uni-directional (left to right)
3) Printing speeds :

Normal characters	45 cps
Enlarged characters	22.5 cps
Condensed mode 1	40 cps
Condensed mode 2	34 cps
Emphasized characters	20 cps

4) Paper feed : Friction feed
5) Line spacing : 1/6 or 1/9 inch
6) Line feed speed : Approx. 1.2 line/sec
7) Number of columns per character line :

Normal characters	40 cps
Enlarged characters	20 cps
Condensed mode 1	80 cps
Condensed mode 2	72 cps

8) Character sets : ASCII (95 characters)
9 International character set (128 characters including Kana and Graphics)
9) Character fonts : 5 × 9 dot matrix font (text mode)
6 × 8 dot matrix font (graphics mode)
10) Character sizes (W × H) :

Normal characters	1.7 × 2.4mm
Enlarged characters	3.5 × 2.4mm
Condensed characters	0.9 × 2.4mm
Emphasized characters	1.8 × 2.4mm

II. Paper

1) Brand : Epson thermal roll paper (P40TRP)
2) Type : Thermal paper (black)
3) Width : $112 \pm ^{0}_{1}$ mm
4) Roll diameter : $\phi 30$ mm or less
5) Roll length : 11 m or longer

III. Power supply

1) Built-in power supply : NiCd battery pack
2) External power supply: AC adapter

IV. Reliability

1) MCBF (Mean cycle between failure) :
5×10^5 lines (for parts other than the thermal head)
2) Life of thermal head : 5×10^5 lines

V. Environmental conditions

1) Temperature : 5 to 35°C
2) Humidity : 10 to 80%

VI. Dimensions and weight

1) Dimensions : 46 (H) × 216 (W) × 128 (D) mm
2) Weight : 650 g (without roll paper)

APPENDIX B. Interface

There are two types of the P-40: a serial type equipped with a RS-232C interface, and a parallel type equipped with a Centronics interface.

B.1 Serial Interface

[Specifications]

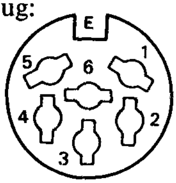
Bit rate : Selected by the DIP switches on the control circuit board.
Synchronization : Asynchronous
Handshaking : The DTR signal must be checked by the host each time a character has been transmitted to the printer.
Signal levels :

Voltage	Logical value
+3 to +18 V	Space 0
−3 to −18 V	Mark 1

Data format : Selected by the DIP switches on the control circuit board.

[Interface connector]

Plug:



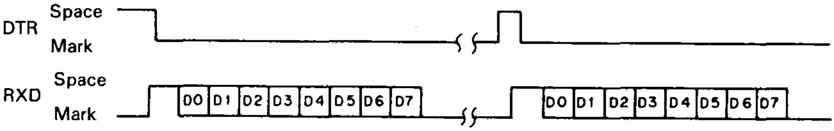
6-pin DIN plug
(The length of the interface cable should be kept as short as possible.)

[Interface signals]

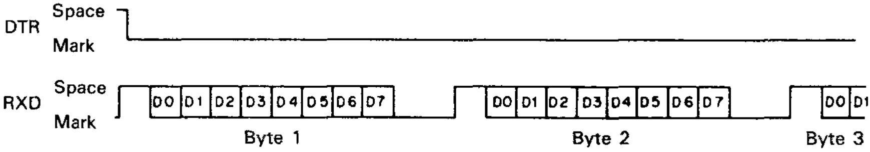
pin No.	Signal name	Source	Description
1			
2	DTR	Printer	Indicates that the printer is not ready to receive data.
3	RXD	Host computer	Data from the host computer.
4			
5	GND		Printer control circuit ground
6			
E	FG		Frame ground

[Timing chart]

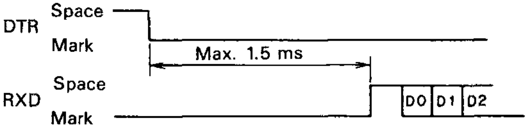
1) Standard timing



2) The P-40 has a two-byte input buffer. Therefore, if the host computer transmits data without checking the DTR signal, the first two data bytes are queued into the buffer but the following bytes are discarded.



3) The P-40 has no ONLINE switch, so it is always online. When the control circuit checks the PF switch, if paper feeding is being performed the control circuit pulls the DTR signal LOW to inform the host computer of the busy condition. When DTR goes LOW, data received up to 1.5 ms later is accepted, but after that period any data received is discarded.



B.2 Parallel Interface

[Specifications]

Data transmission: 8-bit parallel
Synchronization: Timing for the printer to read data signals is provided by external strobe signals
Handshake protocal: By $\overline{\text{ACKNLG}}$ and Busy signals
Signal levels: The levels of input data and interface control signals are all TTL-compatible.

[Interface connector]

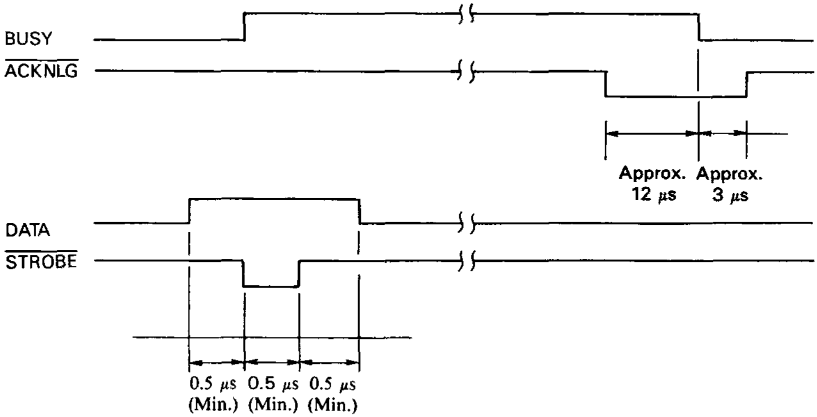
Plug: 57-30360 (AMPHENOL)
The connector cable should be kept as short as possible.

[Input connector pin assignments and description of signals]

Pin	Return line	Signal name	Sender	Description
1	19	$\overline{\text{STROBE}}$	Host computer	Provides the timing at which the printer reads data signals. This signal is active low, and data signals are read after this signal has dropped to Low. The pulse width must be 0.5 μs or longer at the receiving end.
2	20	DATA0	Host computer	Data bits 0 to 7. "HIGH" indicates "1" and "LOW" indicates "0".
3	21	DATA1	Host computer	
4	22	DATA2	Host computer	
5	23	DATA3	Host computer	
6	24	DATA4	Host computer	
7	25	DATA5	Host computer	
8	26	DATA6	Host computer	
9	27	DATA7	Host computer	
10	28	$\overline{\text{ACKNLG}}$	Printer	When LOW, indicates that the printer has received the last data sent and that it is ready to receive the next data. The pulse width is about 18 μs.

Pin No.	Return line pin No.	Signal name	Sender	Description
11	29	BUSY	Printer	When HIGH, indicates that the printer is not ready to receive data; when LOW, indicates that it is ready to receive data. The busy signal goes to High when the printer is in the following states. • Offline • Printer error The printer motor does not rotate. • Others When the printer cannot receive data.
12	30	PE	Printer	Always LOW (Grounded)
13	—	SLCT	Printer	Always HIGH (Pulled up to +5V through 10KΩ)
14	—	$\overline{\text{AUTO FEED XT}}$	Host computer	When this signal drops to LOW, the printer advances paper by one line after it has printed preceding data.
15	—	NC		Not connected.
16	—	0V		Signal ground (0V level)
18	—	NC		Not connected.
19 30	—	GND		Twisted pair return line (ground level)
31	—	$\overline{\text{INT}}$	Host computer	When LOW, resets the printer controller to the initial state and clears the printer buffer. The pulse width must be 50μs or longer at the receiving end.
32	—	$\overline{\text{ERROR}}$	Printer	Always HIGH (Pulled up to +5V through 10kΩ.)
33	—	GND		Twisted pair return line (ground level)
34	—	NC		Not connected.
35	—	+5V		Pulled up to +5V through 10kΩ.
36	—	NC		Not connected.

[Standard parallel interface timing chart for data transmission]



Note:
The PE, SLCT, and $\overline{\text{ERROR}}$ *signals are always HIGH or LOW, and are not checked by the printer controller.*

PE: *This printer is not provided with a paper end detector. Therefore, the user must check the paper himself.*

SLCT: *This printer is always in the selected state.*

$\overline{\text{ERROR}}$*:* *Printer errors are included in the printer busy state.*

APPENDIX C. Character Code Tables

<USA>

	Hex. No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Hex. No.	Binary No.	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	0	16	32	0 48	@ 64	P 80	` 96	p 112	128	144	160	0 176	@ 192	P 208	` 224	p 240
1	0001	1	17	! 33	1 49	A 65	Q 81	a 97	q 113	129	145	! 161	1 177	A 193	Q 209	a 225	q 241
2	0010	2	DC2 18	" 34	2 50	B 66	R 82	b 98	r 114	130	DC2 146	" 162	2 178	B 194	R 210	b 226	r 242
3	0011	3	19	# 35	3 51	C 67	S 83	c 99	s 115	131	147	# 163	3 179	C 195	S 211	c 227	s 243
4	0100	4	DC4 20	$ 36	4 52	D 68	T 84	d 100	t 116	132	DC4 148	$ 164	4 180	D 196	T 212	d 228	t 244
5	0101	5	21	% 37	5 53	E 69	U 85	e 101	u 117	133	149	% 165	5 181	E 197	U 213	e 229	u 245
6	0110	6	22	& 38	6 54	F 70	V 86	f 102	v 118	134	150	& 166	6 182	F 198	V 214	f 230	v 246
7	0111	7	23	' 39	7 55	G 71	W 87	g 103	w 119	135	151	' 167	7 183	G 199	W 215	g 231	w 247
8	1000	8	24	(40	8 56	H 72	X 88	h 104	x 120	136	152	(168	8 184	H 200	X 216	h 232	x 248
9	1001	9	25	) 41	9 57	I 73	Y 89	i 105	y 121	137	153	) 169	9 185	I 201	Y 217	i 232	y 249
A	1010	LF 10	26	* 42	: 58	J 74	Z 90	j 106	z 122	LF 138	154	* 170	: 186	J 202	Z 218	j 234	z 250
B	1011	11	ESC 27	+ 43	; 59	K 75	[91	k 107	{ 123	139	ESC 155	+ 171	; 187	K 203	[219	k 235	{ 251
C	1100	12	28	, 44	< 60	L 76	\ 92	l 108	¦ 124	140	156	, 172	< 188	L 204	\ 220	l 236	¦ 252
D	1101	CR 13	29	- 45	= 61	M 77	] 93	m 109	} 125	CR 141	157	- 173	= 189	M 205	] 221	m 237	} 253
E	1110	SO 14	30	. 46	> 62	N 78	^ 94	n 110	~ 126	SO 142	158	. 174	> 190	N 206	^ 222	n 238	~ 254
F	1111	SI 15	31	/ 47	? 63	O 79	_ 95	o 111	Δ 127	SI 143	159	/ 175	? 191	O 207	_ 223	o 239	Δ 255

< France >

	Hex. No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Hex. No.	Binary No.	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	0	16	32	0 48	à 64	P 80	` 96	p 112	128	144	160	0 176	à 192	P 208	` 224	p 240
1	0001	1	17	! 33	1 49	A 65	Q 81	a 97	q 113	129	145	! 161	1 177	A 193	Q 209	a 225	q 241
2	0010	2	DC2 18	" 34	2 50	B 66	R 82	b 98	r 114	130	DC2 146	" 162	2 178	B 194	R 210	b 226	r 242
3	0011	3	19	# 35	3 51	C 67	S 83	c 99	s 115	131	147	# 163	3 179	C 195	S 211	c 227	s 243
4	0100	4	DC4 20	$ 36	4 52	D 68	T 84	d 100	t 116	132	DC4 148	$ 164	4 180	D 196	T 212	d 228	t 244
5	0101	5	21	% 37	5 53	E 69	U 85	e 101	u 117	133	149	% 165	5 181	E 197	U 213	e 229	u 245
6	0110	6	22	& 38	6 54	F 70	V 86	f 102	v 118	134	150	& 166	6 182	F 198	V 214	f 230	v 246
7	0111	7	23	' 39	7 55	G 71	W 87	g 103	w 119	135	151	' 167	7 183	G 199	W 215	g 231	w 247
8	1000	8	24	(40	8 56	H 72	X 88	h 104	x 120	136	152	(168	8 184	H 200	X 216	h 232	x 248
9	1001	9	25	) 41	9 57	I 73	Y 89	i 105	y 121	137	153	) 169	9 185	I 201	Y 217	i 232	y 249
A	1010	LF 10	26	* 42	: 58	J 74	Z 90	j 106	z 122	LF 138	154	* 170	: 186	J 202	Z 218	j 234	z 250
B	1011	11	ESC 27	+ 43	; 59	K 75	° 91	k 107	é 123	139	ESC 155	+ 171	; 187	K 203	° 219	k 235	é 251
C	1100	12	28	, 44	< 60	L 76	ç 92	l 108	ù 124	140	156	, 172	< 188	L 204	ç 220	l 236	ù 252
D	1101	CR 13	29	- 45	= 61	M 77	§ 93	m 109	è 125	CR 141	157	- 173	= 189	M 205	§ 221	m 237	è 253
E	1110	SO 14	30	. 46	> 62	N 78	^ 94	n 110	¨ 126	SO 142	158	. 174	> 190	N 206	^ 222	n 238	¨ 254
F	1111	SI 15	31	/ 47	? 63	O 79	_ 95	o 111	127	SI 143	159	/ 175	? 191	O 207	_ 223	o 239	255

< Germany >

	Hex. No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Hex. No.	Binary No.	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	0	16	32	0 48	§ 64	P 80	\` 96	p 112	128	144	160	0 176	§ 192	P 208	\` 224	p 240
1	0001	1	17	! 33	1 49	A 65	Q 81	a 97	q 113	129	145	! 161	1 177	A 193	Q 209	a 225	q 241
2	0010	2	DC2 18	" 34	2 50	B 66	R 82	b 98	r 114	130	DC2 146	" 162	2 178	B 194	R 210	b 226	r 242
3	0011	3	19	# 35	3 51	C 67	S 83	c 99	s 115	131	147	# 163	3 179	C 195	S 211	c 227	s 243
4	0100	4	DC4 20	$ 36	4 52	D 68	T 84	d 100	t 116	132	DC4 148	$ 164	4 180	D 196	T 212	d 228	t 244
5	0101	5	21	% 37	5 53	E 69	U 85	e 101	u 117	133	149	% 165	5 181	E 197	U 213	e 229	u 245
6	0110	6	22	& 38	6 54	F 70	V 86	f 102	v 118	134	150	& 166	6 182	F 198	V 214	f 230	v 246
7	0111	7	23	' 39	7 55	G 71	W 87	g 103	w 119	135	151	' 167	7 183	G 199	W 215	g 231	w 247
8	1000	8	24	(40	8 56	H 72	X 88	h 104	x 120	136	152	(168	8 184	H 200	X 216	h 232	x 248
9	1001	9	25	) 41	9 57	I 73	Y 89	i 105	y 121	137	153	) 169	9 185	I 201	Y 217	i 232	y 249
A	1010	LF 10	26	* 42	: 58	J 74	Z 90	j 106	z 122	LF 138	154	* 170	: 186	J 202	Z 218	j 234	z 250
B	1011	11	ESC 27	+ 43	; 59	K 75	Ä 91	k 107	ä 123	139	ESC 155	+ 171	; 187	K 203	Ä 219	k 235	ä 251
C	1100	12	28	, 44	< 60	L 76	Ö 92	l 108	ö 124	140	156	, 172	< 188	L 204	Ö 220	l 236	ö 252
D	1101	CR 13	29	- 45	= 61	M 77	Ü 93	m 109	ü 125	CR 141	157	- 173	= 189	M 205	Ü 221	m 237	ü 253
E	1110	SO 14	30	. 46	> 62	N 78	^ 94	n 110	ß 126	SO 142	158	. 174	> 190	N 206	^ 222	n 238	ß 254
F	1111	SI 15	31	/ 47	? 63	O 79	_ 95	o 111	127	SI 143	159	/ 175	? 191	O 207	_ 223	o 239	255

< Denmark >

	Hex. No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Hex. No.	Binary No.	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	0	16	32	0 48	@ 64	P 80	` 96	p 112	128	144	160	0 176	@ 192	P 208	` 224	p 240
1	0001	1	17	! 33	1 49	A 65	Q 81	a 97	q 113	129	145	! 161	1 177	A 193	Q 209	a 225	q 241
2	0010	2	DC2 18	" 34	2 50	B 66	R 82	b 98	r 114	130	DC2 146	" 162	2 178	B 194	R 210	b 226	r 242
3	0011	3	19	# 35	3 51	C 67	S 83	c 99	s 115	131	147	# 163	3 179	C 195	S 211	c 227	s 243
4	0100	4	DC4 20	$ 36	4 52	D 68	T 84	d 100	t 116	132	DC4 148	$ 164	4 180	D 196	T 212	d 228	t 244
5	0101	5	21	% 37	5 53	E 69	U 85	e 101	u 117	133	149	% 165	5 181	E 197	U 213	e 229	u 245
6	0110	6	22	& 38	6 54	F 70	V 86	f 102	v 118	134	150	& 166	6 182	F 198	V 214	f 230	v 246
7	0111	7	23	' 39	7 55	G 71	W 87	g 103	w 119	135	151	' 167	7 183	G 199	W 215	g 231	w 247
8	1000	8	24	(40	8 56	H 72	X 88	h 104	x 120	136	152	(168	8 184	H 200	X 216	h 232	x 248
9	1001	9	25	) 41	9 57	I 73	Y 89	i 105	y 121	137	153	) 169	9 185	I 201	Y 217	i 232	y 249
A	1010	LF 10	26	* 42	: 58	J 74	Z 90	j 106	z 122	LF 138	154	* 170	: 186	J 202	Z 218	j 234	z 250
B	1011	11	ESC 27	+ 43	; 59	K 75	Æ 91	k 107	æ 123	139	ESC 155	+ 171	; 187	K 203	Æ 219	k 235	æ 251
C	1100	12	28	, 44	< 60	L 76	Ø 92	l 108	ø 124	140	156	, 172	< 188	L 204	Ø 220	l 236	ø 252
D	1101	CR 13	29	- 45	= 61	M 77	Å 93	m 109	å 125	CR 141	157	- 173	= 189	M 205	Å 221	m 237	å 253
E	1110	SO 14	30	. 46	> 62	N 78	^ 94	n 110	~ 126	SO 142	158	. 174	> 190	N 206	^ 222	n 238	~ 254
F	1111	SI 15	31	/ 47	? 63	O 79	_ 95	o 111	127	SI 143	159	/ 175	? 191	O 207	_ 223	o 239	255

<Sweden>

	Hex. No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Hex. No.	Binary No.	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	0	16	32	0 48	É 64	P 80	é 96	p 112	128	144	160	0 176	É 192	P 208	é 224	p 240
1	0001	1	17	! 33	1 49	A 65	Q 81	a 97	q 113	129	145	! 161	1 177	A 193	Q 209	a 225	q 241
2	0010	2	DC2 18	" 34	2 50	B 66	R 82	b 98	r 114	130	DC2 146	" 162	2 178	B 194	R 210	b 226	r 242
3	0011	3	19	# 35	3 51	C 67	S 83	c 99	s 115	131	147	# 163	3 179	C 195	S 211	c 227	s 243
4	0100	4	DC4 20	¤ 36	4 52	D 68	T 84	d 100	t 116	132	DC4 148	¤ 164	4 180	D 196	T 212	d 228	t 244
5	0101	5	21	% 37	5 53	E 69	U 85	e 101	u 117	133	149	% 165	5 181	E 197	U 213	e 229	u 245
6	0110	6	22	& 38	6 54	F 70	V 86	f 102	v 118	134	150	& 166	6 182	F 198	V 214	f 230	v 246
7	0111	7	23	' 39	7 55	G 71	W 87	g 103	w 119	135	151	' 167	7 183	G 199	W 215	g 231	w 247
8	1000	8	24	(40	8 56	H 72	X 88	h 104	x 120	136	152	(168	8 184	H 200	X 216	h 232	x 248
9	1001	9	25	) 41	9 57	I 73	Y 89	i 105	y 121	137	153	) 169	9 185	I 201	Y 217	i 232	y 249
A	1010	LF 10	26	* 42	: 58	J 74	Z 90	j 106	z 122	LF 138	154	* 170	: 186	J 202	Z 218	j 234	z 250
B	1011	11	ESC 27	+ 43	; 59	K 75	Ä 91	k 107	ä 123	139	ESC 155	+ 171	; 187	K 203	Ä 219	k 235	ä 251
C	1100	12	28	, 44	< 60	L 76	Ö 92	l 108	ö 124	140	156	, 172	< 188	L 204	Ö 220	l 236	ö 252
D	1101	CR 13	29	- 45	= 61	M 77	Å 93	m 109	å 125	CR 141	157	- 173	= 189	M 205	Å 221	m 237	å 253
E	1110	SO 14	30	. 46	> 62	N 78	Ü 94	n 110	ü 126	SO 142	158	. 174	> 190	N 206	Ü 222	n 238	ü 254
F	1111	SI 15	31	/ 47	? 63	O 79	_ 95	o 111	127	SI 143	159	/ 175	? 191	O 207	_ 223	o 239	255

< Italy >

	Hex. No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Hex. No.	Binary No.	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	0	16	32	0 48	@ 64	P 80	ù 96	p 112	128	144	160	0 176	@ 192	P 208	ù 224	p 240
1	0001	1	17	! 33	1 49	A 65	Q 81	a 97	q 113	129	145	! 161	1 177	A 193	Q 209	a 225	q 241
2	0010	2	DC2 18	" 34	2 50	B 66	R 82	b 98	r 114	130	DC2 146	" 162	2 178	B 194	R 210	b 226	r 242
3	0011	3	19	# 35	3 51	C 67	S 83	c 99	s 115	131	147	# 163	3 179	C 195	S 211	c 227	s 243
4	0100	4	DC4 20	$ 36	4 52	D 68	T 84	d 100	t 116	132	DC4 148	$ 164	4 180	D 196	T 212	d 228	t 244
5	0101	5	21	% 37	5 53	E 69	U 85	e 101	u 117	133	149	% 165	5 181	E 197	U 213	e 229	u 245
6	0110	6	22	& 38	6 54	F 70	V 86	f 102	v 118	134	150	& 166	6 182	F 198	V 214	f 230	v 246
7	0111	7	23	' 39	7 55	G 71	W 87	g 103	w 119	135	151	' 167	7 183	G 199	W 215	g 231	w 247
8	1000	8	24	(40	8 56	H 72	X 88	h 104	x 120	136	152	(168	8 184	H 200	X 216	h 232	x 248
9	1001	9	25	) 41	9 57	I 73	Y 89	i 105	y 121	137	153	) 169	9 185	I 201	Y 217	i 232	y 249
A	1010	LF 10	26	* 42	: 58	J 74	Z 90	j 106	z 122	LF 138	154	* 170	: 186	J 202	Z 218	j 234	z 250
B	1011	11	ESC 27	+ 43	; 59	K 75	° 91	k 107	à 123	139	ESC 155	+ 171	; 187	K 203	° 219	k 235	à 251
C	1100	12	28	, 44	< 60	L 76	\ 92	l 108	ò 124	140	156	, 172	< 188	L 204	\ 220	l 236	ò 252
D	1101	CR 13	29	- 45	= 61	M 77	é 93	m 109	è 125	CR 141	157	- 173	= 189	M 205	é 221	m 237	è 253
E	1110	SO 14	30	. 46	> 62	N 78	^ 94	n 110	ì 126	SO 142	158	. 174	> 190	N 206	^ 222	n 238	ì 254
F	1111	SI 15	31	/ 47	? 63	O 79	_ 95	o 111	127	SI 143	159	/ 175	? 191	O 207	_ 223	o 239	255

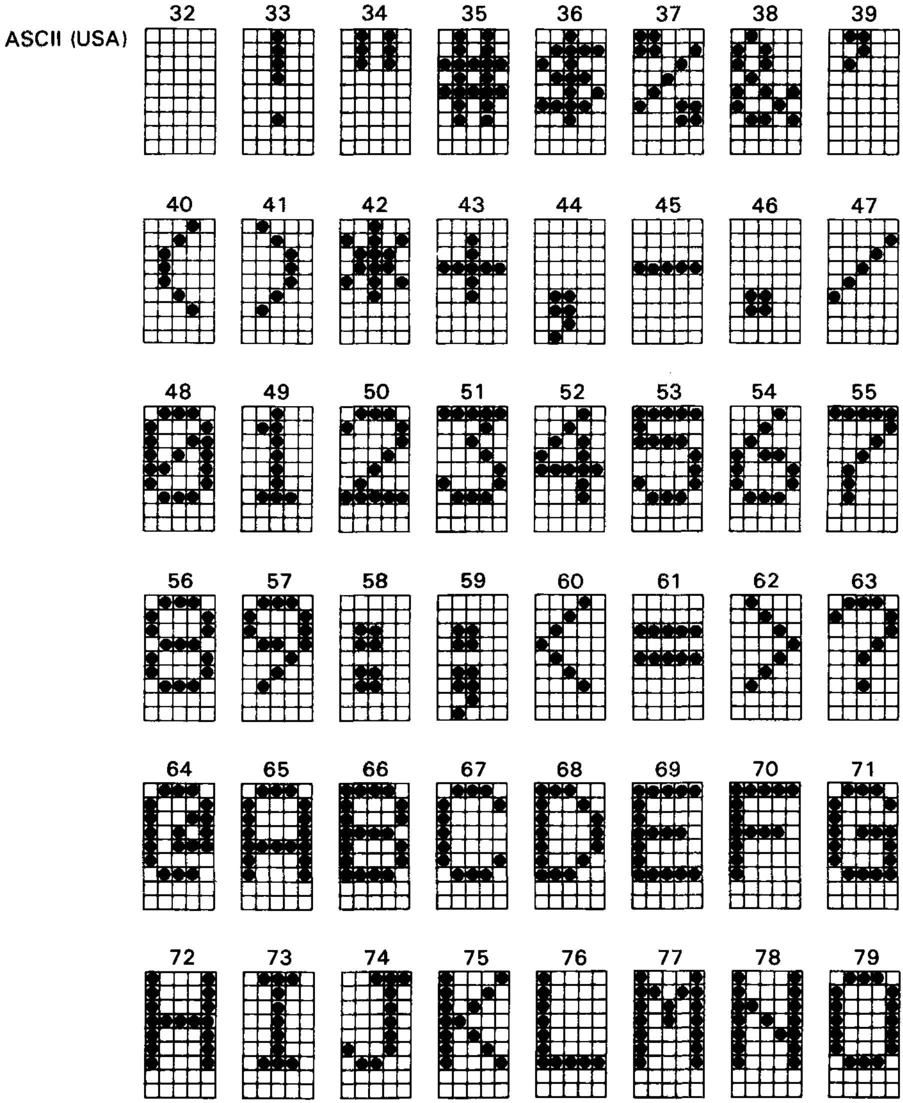
< Spain >

	Hex. No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Hex. No.	Binary No.	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	0	16	32	0 48	@ 64	P 80	` 96	p 112	128	144	160	0 176	@ 192	P 208	` 224	p 240
1	0001	1	17	! 33	1 49	A 65	Q 81	a 97	q 113	129	145	! 161	1 177	A 193	Q 209	a 225	q 241
2	0010	2	DC2 18	" 34	2 50	B 66	R 82	b 98	r 114	130	DC2 146	" 162	2 178	B 194	R 210	b 226	r 242
3	0011	3	19	₧ 35	3 51	C 67	S 83	c 99	s 115	131	147	₧ 163	3 179	C 195	S 211	c 227	s 243
4	0100	4	DC4 20	$ 36	4 52	D 68	T 84	d 100	t 116	132	DC4 148	$ 164	4 180	D 196	T 212	d 228	t 244
5	0101	5	21	% 37	5 53	E 69	U 85	e 101	u 117	133	149	% 165	5 181	E 197	U 213	e 229	u 245
6	0110	6	22	& 38	6 54	F 70	V 86	f 102	v 118	134	150	& 166	6 182	F 198	V 214	f 230	v 246
7	0111	7	23	' 39	7 55	G 71	W 87	g 103	w 119	135	151	' 167	7 183	G 199	W 215	g 231	w 247
8	1000	8	24	(40	8 56	H 72	X 88	h 104	x 120	136	152	(168	8 184	H 200	X 216	h 232	x 248
9	1001	9	25	) 41	9 57	I 73	Y 89	i 105	y 121	137	153	) 169	9 185	I 201	Y 217	i 232	y 249
A	1010	LF 10	26	* 42	: 58	J 74	Z 90	j 106	z 122	LF 138	154	* 170	: 186	J 202	Z 218	j 234	z 250
B	1011	11	ESC 27	+ 43	; 59	K 75	¡ 91	k 107	¨ 123	139	ESC 155	+ 171	; 187	K 203	¡ 219	k 235	¨ 251
C	1100	12	28	, 44	< 60	L 76	Ñ 92	l 108	ñ 124	140	156	, 172	< 188	L 204	Ñ 220	l 236	ñ 252
D	1101	CR 13	29	- 45	= 61	M 77	¿ 93	m 109	} 125	CR 141	157	- 173	= 189	M 205	¿ 221	m 237	} 253
E	1110	SO 14	30	. 46	> 62	N 78	^ 94	n 110	~ 126	SO 142	158	. 174	> 190	N 206	^ 222	n 238	~ 254
F	1111	SI 15	31	/ 47	? 63	O 79	_ 95	o 111	127	SI 143	159	/ 175	? 191	O 207	_ 223	o 239	256

<Japan>

	Hex. No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Hex. No.	Binary No.	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	0	16	32	0 48	@ 64	P 80	` 96	p 112	▁ 128	┴ 144	160	ｰ 176	ﾀ 192	ﾐ 208	═ 224	╳ 240
1	0001	1	17	! 33	1 49	A 65	Q 81	a 97	q 113	▂ 129	┬ 145	｡ 161	ｱ 177	ﾁ 193	ﾑ 209	╞ 225	円 241
2	0010	2	DC2 18	" 34	2 50	B 66	R 82	b 98	r 114	▃ 130	┤ 146	｢ 162	ｲ 178	ﾂ 194	ﾒ 210	╪ 226	年 242
3	0011	3	19	# 35	3 51	C 67	S 83	c 99	s 115	▄ 131	├ 147	｣ 163	ｳ 179	ﾃ 195	ﾓ 211	╡ 227	月 243
4	0100	4	DC4 20	$ 36	4 52	D 68	T 84	d 100	t 116	▅ 132	▔ 148	､ 164	ｴ 180	ﾄ 196	ﾔ 212	◢ 228	日 244
5	0101	5	21	% 37	5 53	E 69	U 85	e 101	u 117	▆ 133	─ 149	･ 165	ｵ 181	ﾅ 197	ﾕ 213	◣ 229	時 245
6	0110	6	22	& 38	6 54	F 70	V 86	f 102	v 118	▇ 134	│ 150	ｦ 166	ｶ 182	ﾆ 198	ﾖ 214	◥ 230	分 246
7	0111	7	23	' 39	7 55	G 71	W 87	g 103	w 119	█ 135	▕ 151	ｧ 167	ｷ 183	ﾇ 199	ﾗ 215	◤ 231	秒 247
8	1000	8	24	(40	8 56	H 72	X 88	h 104	x 120	▏ 136	┌ 152	ｨ 168	ｸ 184	ﾈ 200	ﾘ 216	♠ 232	〒 248
9	1001	9	25	) 41	9 57	I 73	Y 89	i 105	y 121	▎ 137	┐ 153	ｩ 169	ｹ 185	ﾉ 201	ﾙ 217	♥ 232	市 249
A	1010	LF 10	26	* 42	: 58	J 74	Z 90	j 106	z 122	▍ 138	└ 154	ｪ 170	ｺ 186	ﾊ 202	ﾚ 218	♦ 234	区 250
B	1011	11	ESC 27	+ 43	; 59	K 75	[91	k 107	{ 123	▌ 139	┘ 155	ｫ 171	ｻ 187	ﾋ 203	ﾛ 219	♣ 235	町 251
C	1100	12	28	, 44	< 60	L 76	¥ 92	l 108	¦ 124	▋ 140	╭ 156	ｬ 172	ｼ 188	ﾌ 204	ﾜ 220	● 236	村 252
D	1101	CR 13	29	- 45	= 61	M 77	] 93	m 109	} 125	▊ 141	╮ 157	ｭ 173	ｽ 189	ﾍ 205	ﾝ 221	○ 237	人 253
E	1110	SO 14	30	. 46	> 62	N 78	^ 94	n 110	~ 126	▉ 142	╰ 158	ｮ 174	ｾ 190	ﾎ 206	ﾞ 222	╱ 238	▒ 254
F	1111	SI 15	31	/ 47	? 63	O 79	_ 95	o 111	127	┼ 143	╯ 159	ｯ 175	ｿ 191	ﾏ 207	ﾟ 223	╲ 239	255

APPENDIX D. Character Font Table



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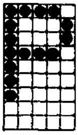
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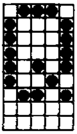
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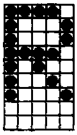
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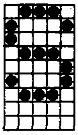
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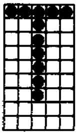
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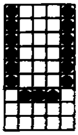
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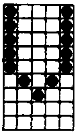
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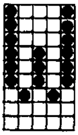

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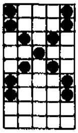
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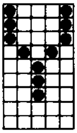
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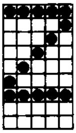
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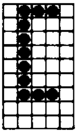
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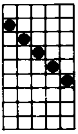
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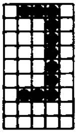
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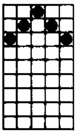
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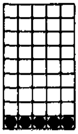

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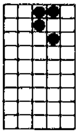
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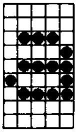
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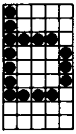
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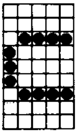
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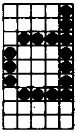
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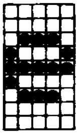
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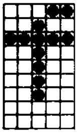
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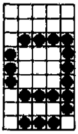

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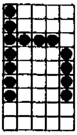
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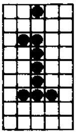
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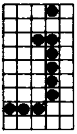
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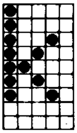
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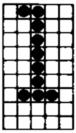
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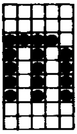
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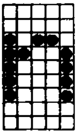
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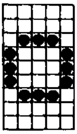

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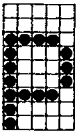
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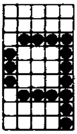
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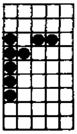
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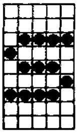
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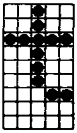
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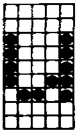
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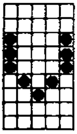
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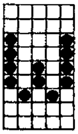

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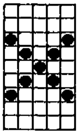
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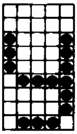
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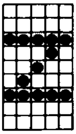
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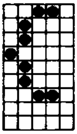
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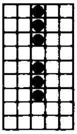
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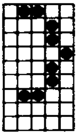
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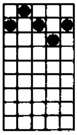
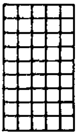

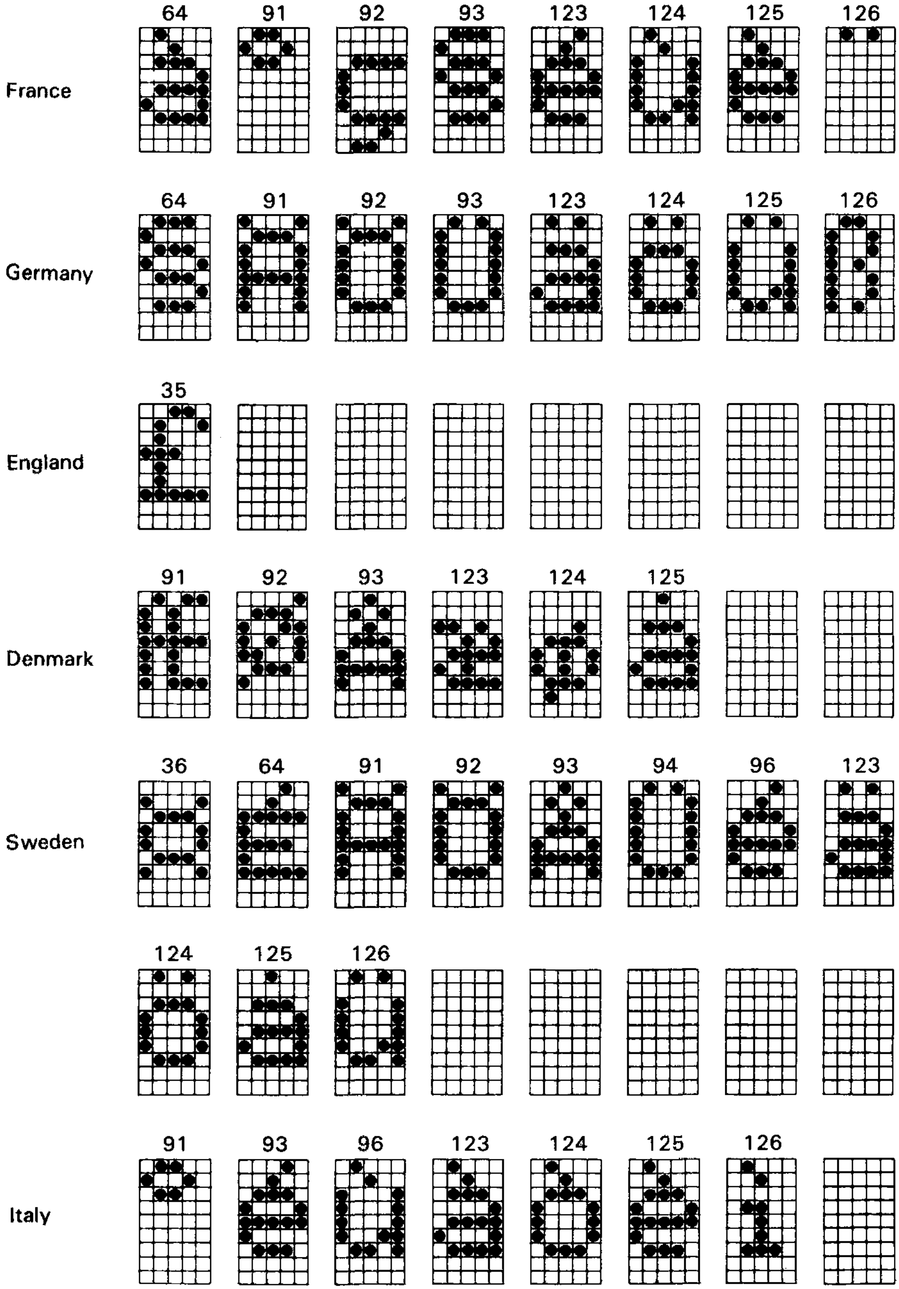
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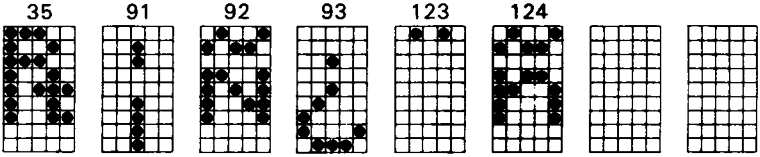

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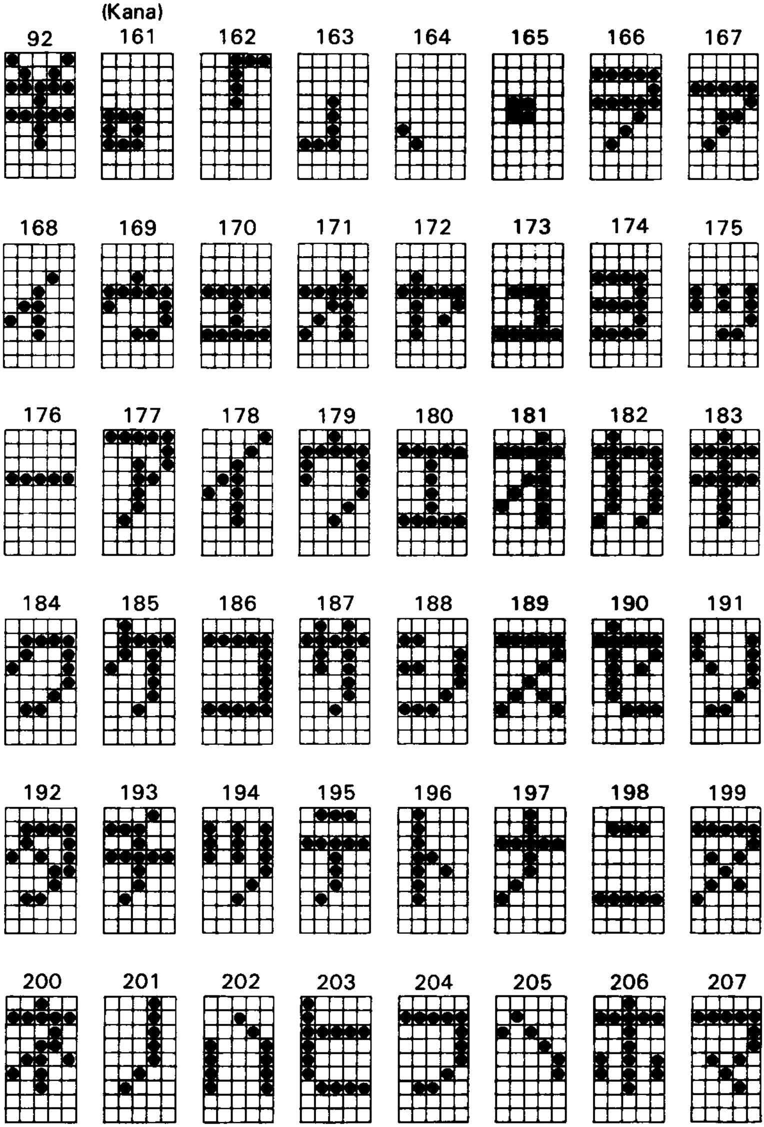
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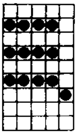
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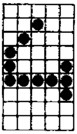
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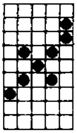
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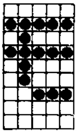
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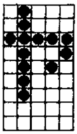
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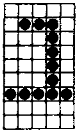
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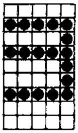
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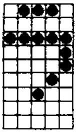

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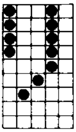
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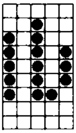
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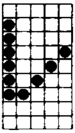
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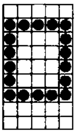
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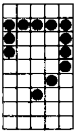
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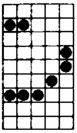
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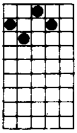
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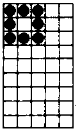

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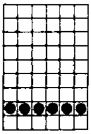
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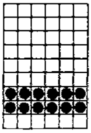
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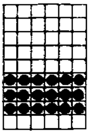
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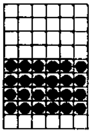
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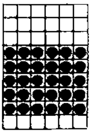
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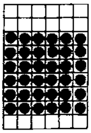
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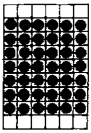
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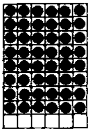

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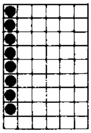
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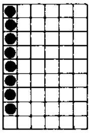
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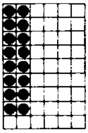
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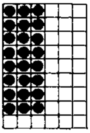
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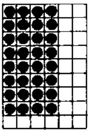
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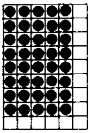
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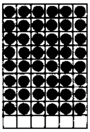
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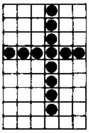

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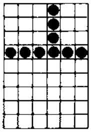
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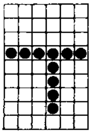
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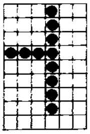
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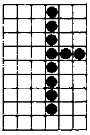
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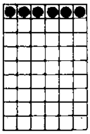
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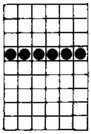
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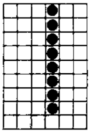
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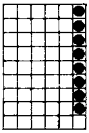

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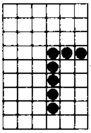
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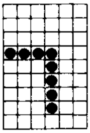
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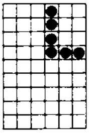
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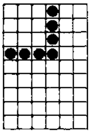
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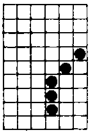
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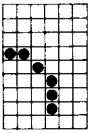
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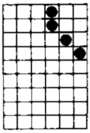
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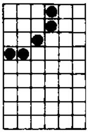

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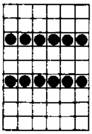
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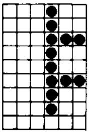
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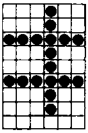
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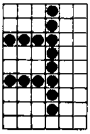
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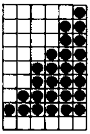
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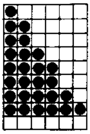
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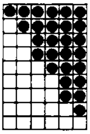
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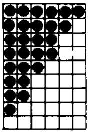

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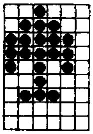
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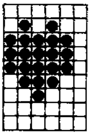
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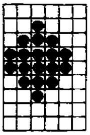
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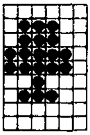
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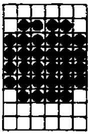
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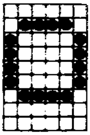
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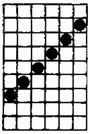
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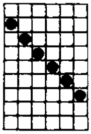

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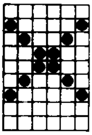
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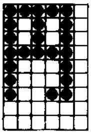
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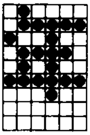
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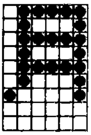
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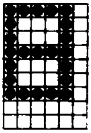
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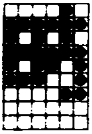
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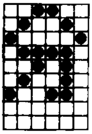
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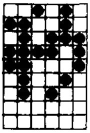

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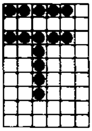
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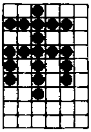
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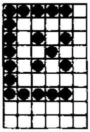
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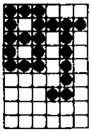
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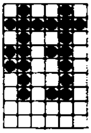
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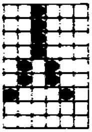
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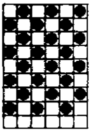
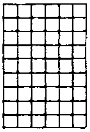

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